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Cruise Report
POSEIDON P418-2

Tórshavn – Tromsø
23. July – 7. August 2011
Technical Report

1. Aims of the cruise

The last part of the transit voyage of RV POSEIDON to Tromsø (Norway) during summer 2011 was used to pursue and complete ongoing research in the Nordic Seas.
To maintain the large-scale monitoring of the Nordic Seas hydrography two Argo-floats were deployed in each of the four basins (Greenland Sea Basin, Lofoten Basin, Norwegian Basin, Iceland Plateau) and CTD-casts were executed for comparison.
To observe the way of the deep water from Fram Strait to the Faroe-Bank-Channel Overflow a CTD-section from the Norwegian Basin to the Iceland Plateau was surveyed.
The previous observations of hydrography were supplemented by high-resolution sections with an underway-CTD from the centre of the Greenland Sea to the surrounding. Of special interest are mesoscale structures like eddies, intrusions or doublediffusion at the front between the different water masses. These are insufficiently observed in the past.
On the east Greenland shelf a mooring array was planned to be recovered.

The cruise was also used as practical education for three students of physical oceanography at the University of Hamburg.

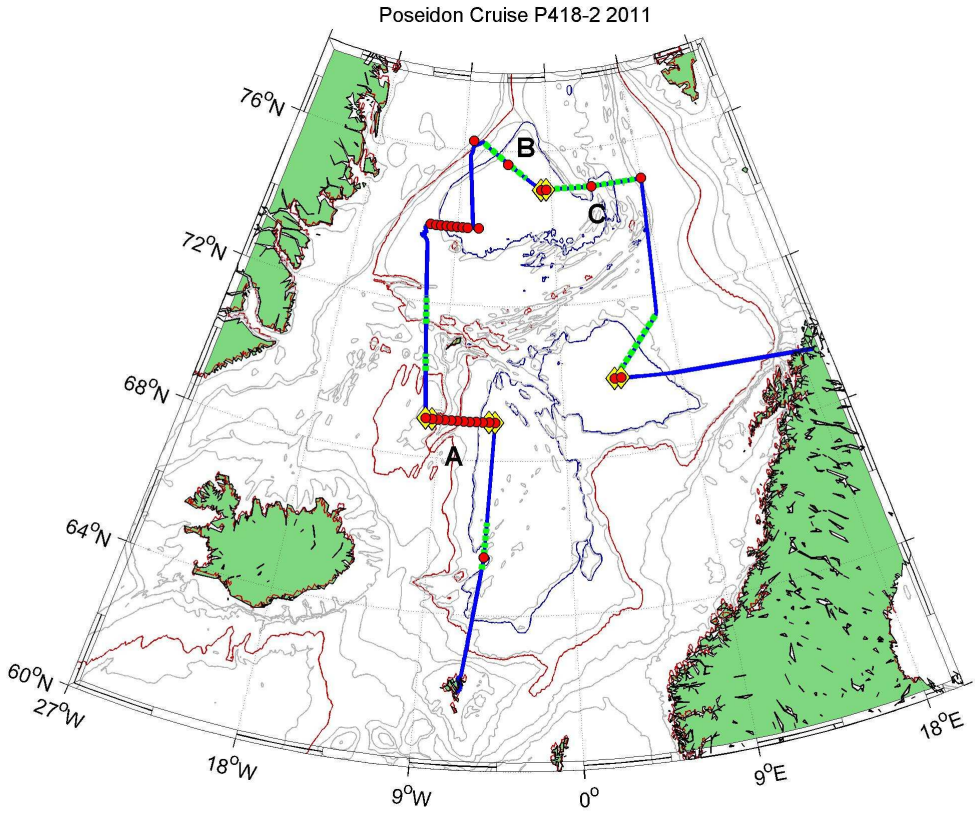

Figure 1: cruise track of RV Poseidon cruise P418-2, July 23 to August 7 2011, with CTD-casts (red dots), Argo float deployments (yellow diamonds) and UCTD-profiles (dashed green line). Letters indicate sections which are described in section 6.

2. Cruise participants

Scientists

Katrin Latarius	Chief Scientist	IfM-ZMAW
Leonie Esters	Student	IfM-ZMAW
Finn Hartwig	Student	IfM-ZMAW
Manuela Köllner	Student	IfM-ZMAW
Martin Moritz	Student	IfM-ZMAW
Aleksi Nummelin	Student	FMI
Andreas Welsch	Technician	IfM-ZMAW

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FI-00101 Helsinki / Finland
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Crew

Matthias Günther	Master
Theo Griese	Chief Officer
Diana Zach	2nd Officer
Hans-Otto Stange	Chief Engineer
Günther Hagedorn	2nd Engineer
Hermann Pregler	Electrician
Rüdiger Engel	Motorman
Frank Schrage	Bosun
Sebastian Knut	Ship Mechanist
Sebastian Hering	Ordinary Seanman
Ronald Rampsch	Able bodied Seaman
Bernd-Michael Hänel	Able bodied Seaman
Ralf Peters	Ship Mechanist
Wilfried Kluge	Cook
Marielle Gehlert	Stewardess

3. Narrative

Saturday, 23th July 2011
Noon position: 62°10' N, 006°35' W
Wind: NNW 5 Bft., Air temperature: 10.1°C, Water te mperature: 10°C

At 9:15 a.m. the scientific crew got a safety instruction by the first mate.
All instruments were already installed by the scientific cew before who were also members of our institute. Only the boxes with the Argo floats, which were loaded in Torshavn, had to be checked. We found out that they were send without manuals and were not marked with their serial numbers, therefore we had to connect all floats to a computer before deployment.
At 12 a.m. RV Poseidon left Torshavn and sailed through the Kalsoyfjord and afterwards along the worlds highest upright sea cliff Enniberg (754 m) and the highest sea cliff Kunoyarnakkur (819 m) approaching the first CTD Station in the Norwegian Basin. The weather was best – sunny with blue sky – which is really untypical for the region.
At 3 p.m. an emergency practice was executed followed by an instruction in the live-saving equipment for the scientists.
The rest of the day was used to build up the Underway-CTD (UCTD) in the back of the ship, and to train how to deploy and haul inboard the probe of the UCTD with the test probe.

Sunday, 24 th July 2011
Noon position: 65°32' N, 005°30' W
Wind: NNE 4 Bft., Air temperature: 7.6°C, Water tem perature: 9.2°C

After breakfast watches started with UCTD-casts on the way to the first CTD-Station (Profile 556, cast 1-8). At 12 a.m. we reached the position and operated a test-profile down to 500 m. Afterwards the second UCTD-Profile was started (Profile 558, cast 9-24). During casts 9 to 20 the ship was steaming with decreasing speed of 6 to 4 kn. We wanted to test, how deep the probe descents depending on the ships speed. Casts 21 to 24 were performed with minimum ship speed of 3.5 kn. At maximum 600 m depth were reached.

Monday, 25 th July 2011
Noon position: 68°23' N, 005°06' W
Wind: N 2 Bft., Air temperature: 5.5°C, Water tempe rature: 8.7°C

On the transit to the centre of the Norwegian Basin water samples were analysed and the data of the first two UCTD-Proifles were processed and plotted. At 5 p.m. the first deep CTD-cast and afterwards the first Argo-float deployment at the same position were performed. At 9 p.m. we reached the position of the second CTD-cast and float deployment in the Norwegian basin. From this position onward a CTD section westward along 69°N onto the Iceland Platea u was corried out.
Together with the crew from the engine we discussed how to move the UCTD-winch to the middle of the stern of Poseidon. We needed more space on deck to additionally install the rewinder in order to use the UCTD in the free-cast mode. The plan was to reach larger depths (~ 1000 m).

Tuesday, 26 th July 2011
Noon position: 69°00' N, 007°46' W
Wind: SSW 4 Bft., Air temperature: 7.4°C, Water tem perature: 8.2°C

The westward CTD-section was continued during the day. At the next-to-last and at the last position of the section two floats for the Iceland Plateau were deployed also. Unfortunately the second float was destroyed during deployment because it moved beneath the ship and was touched by the screw.

Wednesday, 27 th July 2011
Noon position: 70°40' N, 010°33' W
Wind: SSE 5 Bft., Air temperature: 6.5°C, Water tem perature: 5.6°C

At 8 a.m. we started the 3rd UCTD-profile (Stat 571, cast 25-29) on the way to the mooring array on the East Greenland Shelf. The first two casts were achieved with the test-probe to check if we safely recover the probe in the middle of the wake. But everything ran smoothly. For the following casts line was also spooled onto the probes tail. We went with 9 to 10 kn, reaching maximum depths of 625 m. At 12 a.m. we had to stop the UCTD-profile because the line was no longer freely reeling out from the winch. We continued the transit to the ice-edge near the mooring array and the Chief Ing together with his colleagues tried to repair the UCTD-winch. They solved the problem by removal of a 1m/m thick washer from the axis of the line spool. At 5:30 p.m. we were again able to work with the UCTD (profile 4, Stat. 572, casts 30-38). Just before midnight the motor of the winch stopped during hauling inboard the probe. We had to reel it by hand respectively with the help of a powerful drilling machine. It took us approx. 40 minutes to bring 1000 m line in!

Thursday, 28 th July 2011
Noon position: 73°46' N, 012°08' W
Wind: SE 5 Bft., Air temperature: 4.3°C, Water temp erature: -0.7°C

We continued the transit to the ice-edge, which we reached at 8 a.m. in heavy fog. The Captain tried to find a way through the ice westward in direction to the moorings, but the ice coevrage was too high (~70-80%) and the ice floes were too large and thick (~30-60m long; 1-2 m thick). In addition the visibility was extremly low because of the fog. We decided to wait until the next morning; hoping that changing wind directions will loosen up the ice fields. The greenlandish Government was forehanded informed about a CTD section along 74°N from the ice-edge to the east for the next day, in order to use the waiting period for measurements. During the day the team from the engine again managed to repair the winch. The carbon brushes lost contact to the coil because the plastic screws, holding them, were deformed and partly melted by overheating. The coil was checked, but did not have any short-circuit, and the carbon brushes were fixed again. At the end the winch worked properly again. But we decided for the future to reel-in the probe with a maximum ship speed of 4 kn, in case that the whole line is out, to prevent the winch from overheating.

Friday, 29th July 2011
Noon position: 74° 00' N, 010° 31' W
Wind: SSW 3-4 Bft., Air temperature: 2.8°C, Water temperature: 4.0°C

Because the wind and therefore also the ice conditions did not change during the night we started with the CTD section at 6 a.m. at 74°N, 11°30'W near the ice-edge. We did CTD-stations the whole day with a spacing of 10nm on the way east to the central Greenland Sea. During the day we decided to skip the recovery of the moorings from our cruise program. The weather forcast promised changing conditions earliest on Monday, which was too late for the mooring work. In the evening the chief scientist gave a talk about the scientific background and the plans ahead.

Saturday, 30th July 2011
Noon position: 74° 24' N, 007° 39' W
Wind: SSW 4 Bft., Air temperature: 8.4°C, Water temperature: 5.1°C

At 6 a.m. we did the last CTD-Station of the 74°N section at 7°30'W. Afterwards we started travelling to the northernmost point of the survey at approx 76°30'N, 8°30'W. We adjusted the scheduled position to 76°15'N, 7°10 'W, because we found the ice-edge far out from the continental shelf break. There we carried out a CTD-Station with the UCTD-probes attached to the rosette for calibration at 10 p.m.

Sunday, 31th July 2011
Noon position: 75° 45' N, 004° 39' W
Wind: SSW 4 Bft., Air temperature: 2.9°C, Water temperature: 5.5°C

At 0:30 a.m. we started with UCTD-profile 5 (Stat. 583, cast 39-59) in direction to the centre of the Greenland Sea. On this profile we did continuous measurements with 4 kn ship speed, spooling maximum line on the tail and reel-out of the total line. Thererwith we reached a maximum profile depth of ~800 m, 2 casts per hour (~ every 2 nm); down time 8-9 min and up 20 min. We ran the UCTD-winch with air-cooling by the ships compressor to prevent overheating. Weather conditions were extremly uncomfortable for the people on watch running the UCTD.

Monday, 1th August 2011
Noon position: 75° 00' N, 000° 04' W
Wind: SW 5 Bft., Air temperature: 4.5°C, Water temperature: 5.5°C

At 2 a.m. the level wind refused working. Therefore the line was guided to the spoll by hand during reel-in. Afterwards we finished the UCTD-profile and our technician tried to repair the level wind. We sailed to the next CTD and float deployment position in the centre of the Greenland Sea at 75°N, 1°W, which we reached at 6 a.m. At 9 a.m. a CTD-cast to 1000 m depth with UCTD calibration was done and a second float deployment. Both floats in the Greenland Sea are part of the Finnish Argo program. During the morning the level wind was repaired by our technician, who found out, that it stopped because the electronics got wet. This seemed to be caused by the

clamniness due to the implemented air-cooling. We decided not to continue with air-cooling.
At 11 a.m. we started with UCTD-profile 6 (Stat. 585, casts 60-75) from the centre of the Greenland Sea to the east. We did the casts in the same manner as on profile 5. This work continued until the day after the next day.

Tuesday, 2 th August 2011
Noon position: 75° 00' N, 005°35' E
Wind: NNW 3 Bft., Air temperature: 5.3°C, Water tem perature: 6.4°C

Ongoing work with the UCTD on profile 6 without having any technical problems with the winch.

Wednesday, 3 th August 2011
Noon position: 73° 41' N, 008°36' E
Wind: NNW 4 Bft., Air temperature: 6.5°C, Water tem perature: 7.8°C

At 2 a.m. we did the last cast of UCTD profile 6. At 3 a.m. we had a CTD station to 1000 m depth at the end of the east-west-section with UCTD calibration. Afterwards we started transit to 71° 30'N, 8°E were we wanted to begin the next UCTD-profile on the way to the centre of the Lofoten Basin. The transit was used for data processing of CTD and UCTD casts/sections and the analyses of the water samples for salinity sensor calibration. All scientists were happy to have a break in the deck work with the UCTD, because this was very monotonous and weather conditions were quite harsh out on deck..

Thursday, 4 th August 2011
Noon position: 71° 02' N, 006°42' E
Wind: NNE 3 Bft., Air temperature: 7.5°C, Water tem perature: 9.2°C

At 4 a.m. we started with the UCTD-profile 9 (Stat. 592, casts 141-195). We continued this work during the day.

Friday, 5 th August 2011
Noon position: 70° 00' N, 004°32' E
Wind: NE 5 Bft., Air temperature: 8.5°C, Water temp erature: 8.9°C

At 8:30 a.m. we finished the UCTD-profile. Afterwards we did a CTD cast at 70°N, 4°E and a float-deplopyment at the same position. A t 11:30 a.m. we did the last station of the cruise; a CTD-cast down to 2000 m depths with UCTD calibration and a float deployment at the same position. The rest of the day was used to dismantle the UCTD-winch and the Rosette with the CTD-sonde and the lADCPs during the transit to Tromsø. Because we expected to get strong winds from the NE no time was left for further measurements.

Saturday, 6 th August 2011
Noon position: 69°47' N, 012°42' E
Wind: NE 6 Bft., Air temperature: 8.3°C, Water temperature: 11.1°C

The day was used for the final data processing on board and afterwards we loaded our equipment. In the evening the chief scientist did a talk about the finished scientific program of the cruise. Plans and reality were compared and first results, especially from the UCTD- measurements were shown.

Sunday, 7th August 2011
Noon position: 69°42' N, 019°00' E
Air temperature: 9.2°C, Water temperature: 8.9°C

At 7 a.m. the pilot was picked up and at 11 a.m. RV POSEIDON berthed along side at Breivica Terminal, Tromsø. The equipment was unloaded and after the evening coffee the scientists disembarked.

4. Technical Information (and Methods)

CTD/Rosette and hydrographical samples

Altogether 30 standard hydrographic stations were occupied during the cruise, employing a SeaBird SBE911 plus CTD-O_2 sonde, attached to a SeaBird carousel 12 bottle water sampler. These stations were running to full depth or, for UCTD calibration casts, to 1000 m. All sensors except of pressure are sent to the factory once a year for calibration. The pressure sensor is sent to calibration as often as required. The serial numbers of the CTD are:

Instrument/Sensor	**Serial Number**
SBE 11plus	09P9013-0313
Temperature 1: SBE-3-02/F	1526
Conductivity 1: SBE-4-02/2	1222
Pressure 410K-105	53573
Temperature 2: SBE 3-02/F	1540
Conductivity 2: SBE4-02/2	1232
Altimeter PSA 916D	1118
Oxygen SBE 43	1171

At all stations water samples were taken from 4 depth levels within the water column for salinity analyses. The salinity samples were analysed on board using a Guildline Autosal Salinometer. The batch–no. of the standard seawater samples is 38H11 which have a K15-factor of 1.07631 (24°C). Two of the water bottles were also equipped with reversing digital thermometers, providing temperature and pressure check values for the CTD sensors.

Current measurements

Vertical profiles of horizontal currents were made with a lADCP-2 system attached to the rosette water sampler. The system consists of two ADCPs of the Workhorse type (WHM300) manufactured by RD instruments and operating at a frequency of 300 kHz. The serial numbers of the lADCPs are S/N 141909 and S/N 14411.

Underway CTD measurements

Underway measurements of temperature and conductivity profiles to a maximum depth of ~ 800 m were made with an Ocean Science UCTD. We take measurements with ship speed between 3.5 and 10 kn, with or without spooling line onto the tail of the probe. Details about configurations during the casts are summaried in the UCTD-stationlist.xls (see attachment), details of problems with the instrument are also described in the Narrative.

We used two different CTD-probes during this cruise: Probe 0067 (IFM Hamburg) and probe 0068 (IFM-Geomar Kiel) and one UCTD-winch

UCTD 1 (IFM Hanburg)	**Serial Number 0067**
Temperature/Salinity Sensor	Seabird , SN 0067
Pressure Sensor	2000 dBar Kistler, SN 2078954
Firmware Version	V 2.01a
Interface Type	Bluetooth/RS-232C (9600, 8, N)
Conductivity Range	0-7 S/m
Maximum Depth	2000 meters
Temperature Calibration	02-Jan-11, ITS-90 temperature Scale
Conductivity Calibration	02-Jan-11, PSS 1978: C(35,15,0)=4.2914 Siemens/meter
Pressure Calibration	30-Dec-10, 2900 psia S/N 2078954

UCTD 2 (IFM-Geomar Kiel)	**Serial Number 0068**
Temperature/Salinity Sensor	Seabird , SN 0068
Pressure Sensor	2000 dBar Kistler, SN 2078955
Firmware Version	V 2.01a
Interface Type	Bluetooth/RS-232C (9600, 8, N)
Conductivity Range	0-7 S/m
Maximum Depth	2000 meters
Temperature Calibration	23-Jan-11, ITS-90 temperature Scale
Conductivity Calibration	23-Jan-11, PSS 1978: C(35,15,0)=4.2914 Siemens/meter
Pressure Calibration	20-Jan-11, 2900 psia S/N 2078954

UCTD winch (IFM Hanburg)	Serial Number
	S/N WI-0033

Underway Surface temperature and salinity measurements

Underway temperature and salinity measurements were made with a SeaBird thermosalinograph installed in the ship's port well. Additional water samples and measurents of temperature at the instrument's mouth for calibration purposes were made during previous cruises.

Underway Current measurements

Underway current measurements were taken with a vessel-mounted 75 kHz Ocean Surveyor (ADCP) from RDI, covering approximately the top 500-700m of the water column. The bin size was set to 8 m, the ADCP run in narrowband mode. The instrument was controlled by computers using the conventional VMDAS software under a MS Windows system. Pinging was set to 2 s. No interferences with other used acoustical instruments were observed s long as the echo sounder from the bright is offline. Additional navigational data was available from the ship's DAVIS system.

5. First Results

Argo floats

During the cruise 8 Argo floats have been deployed in different areas of the Nordic Seas. In all areas always two floats have been deployed: in the Norwegian Basin (NB), on the Iceland Plateau (IP), in the Greenland Sea (GS) and in the Lofoten Basin (LB) (details see in the table below).

typ	WMO.No.	Ser.No.	Instr # (WEBB)	profile depth (dbar)	deploy date	position lat	position long	area	Program (EURO-Argo)
NEMO	6901058	171		2000	2011/07/25 18:30	69°00.02'N	4°59.94'W	NB	Germany
NEMO	6901059	172		2000	2011/07/25 21:43	68°59.91'N	5°27.31´ W	NB	Germany
APEX	6901070	7829	5810	1300	2011/07/26 21:43	69°00.08'N	9°35.70'W	IS	Germany
APEX	6901069	7822	5809	1300	2011/07/27 00:17	69°00.02'N	10°02.58'W	IS	Germany
APEX	6901087	7755	5731	2000	2011/08/01 18:30	74°59.99'N	1°00.10'W	GS	Finnland
APEX	6901086	7767	5732	2000	2011/08/01 18:30	74°59.87'N	0°29.89' W	GS	Finnland
APEX	6901067	7858	5807	2000	2011/08/05 18:30	69°59.42'N	4°04.12'E	LB	Germany
APEX	6901068	7922	5808	2000	2011/08/05 18:30	69°58.77'N	4°35.99'E	LB	Germany

Float 6901069 was destroyed during deployment

These float deployments are part of the German and Finnish EURO-Argo program. The measurements are carried out since 2001 in the Greenland Sea, since 2003 in the Norwegian Basin and since 2005 in the Lofoten Basin and on the Iceland Plateau. They enable us to monitor the development of the hydrography in the Nordic Seas, which is of crucial interest when changes in the climate are expected. The Nordic Seas are part of the areas in the high latitudes, where transformation of near-surface Atlantic water masses into dense water masses take place. The dense waters will leave the area again to the south as near-bottom outflows across the deep passages of the Greenland-Scotland-Ridge (so called “overflows”) contributing substantially to the North Atlantic Deep Water. Therefore this transformation is part of the northern branch of the global scale Atlantic Meridional Overturning Circulation.
The important advantage of floats is that they supply measurements during the whole year, which offers us insight in the seasonal cycle of hydrography in all. In the past this was not at all possible with ship based measurements because of the harsh weather conditions in the area during at least half of the year. The most important restriction of Argo floats is that profiles of temperature and salinity reach at maximum 2000 m depth. That means we are not able to observe the development of the deep waters but only down to intermediate depth.

CTD section Norwegian Basin – Iceland Plateau

To observe the porpagation of the deep water from Fram Strait to the Faroe-Bank-Channel a CTD-section from the Norwegian Basin to the Iceland Plateau was surveyed.
At the surface the eastern part of the section is occupied by saline (and warm) Atlantic waters. These waters flow into the Nordic Seas from the south with the Norwegian Atlantic Current and become part of the cyclonic circulation in the Norwegian Basin (our section crossed only the western part of the basin). The western part of the section is dominated by Polar Surface waters, which are fresh (and cold) (see salinity section figure 3). This water enters the Nordic Seas from the Arctic Ocean through Fram Strait and continues its way to the south with the East Greenland Current. The distinct front between these two water masses is located above the topographic barrier between the Norwegian Basin and the Iceland Plateau, the Jan-Mayen-Ridge. The salinity difference across the front is nearly compensated by temperature with regard to density. As the sigma.contours show there is only a slight density gradient across the front. Below the surface the flow of Atlantic water, splitting from the cyclonic circulation around the Norwegian Basin, onto the Iceland Plateau is visible as a salinity maximum below the Polar Surface Water. More to the east the flow of relatively fresh water is visible, probably coming in from the south with the East Icelandic Current and contributing to the eastern flank of the cyclonic circulation on the Iceland Plateau. At the western slope of the Norwegian Basin at approx. 1800 to 2300 m depth waters of slightly higher salinities are trapped and - as visible from the isopycnal - flow to the south in direction to the Faroe-Bank-overflow. Also the calculated sigma of above 28.08 matches with the characteristics, which we expect for the overflow waters.
Whether this interpretation of the salinity section in relation to the flow pattern is correct has to be checked during the further data processing with the help of current information from lADCP and ADCP data.

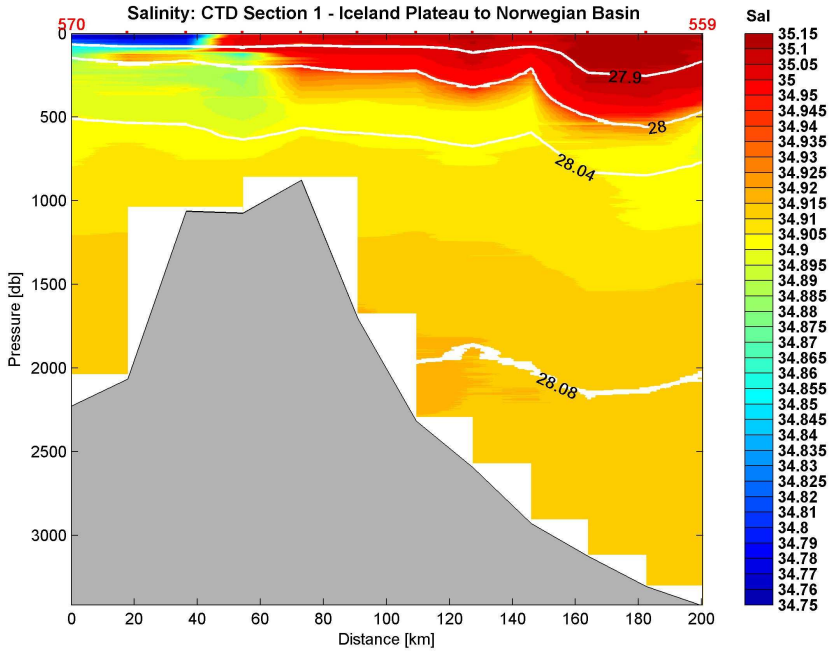

Figure 3: salinity section from the Iceland Plateau to the Norwegian Basin (left/west to right/east) (section A in figure 1), uncalibrated data. Sigma-contours are superimposed in white.

UCTD sections: Greenland Sea and Lofoten Basin

The underway measurements of temperature and salinity profiles with the UCTD are carried out because they allow to collect fine resolved spatial information while spending only little cruise time in comparison to CTD profiles. While sailing with 4 kn we got profiles down to 800 m every 2 nm. Restrictions are of course that the maximum profile depth is only 1000 m and the accuracy of the measurements is unclear at present.

The manufacturer promised an accuracy of ± 0.002 for temperature and ± 0.005 for salinity. We carried out 5 calibration casts for the UCTD during our cruise, where we fixed the two probes to the CTD rosette. These measurements provided us with data for checking the two probes against each other and comparing the probes with the CTD.

In a first approach the temperature and salinity difference from one probe to the other was calculated, given 0.00063 to 0.0017 ℃ for temp erature respectively 0.0115 to 0.0161 for salinity during our cruise. Obviously the differences are not stable, which point out the importance of calibration casts during cruises.

For the two sections B abd C, shown here, we corrected one probe in relation to the other with the mean difference between the probes from all calibration casts along the sections. The absolute correction due to the CTD data will be done later.

In figure 4 section B and C from the Greenland Sea have been combined.

Section B is expanding from the Northwest to the centre of the Greenland Sea whereas section C is expanding from the centre along 75℃N to the East (see figure 1).

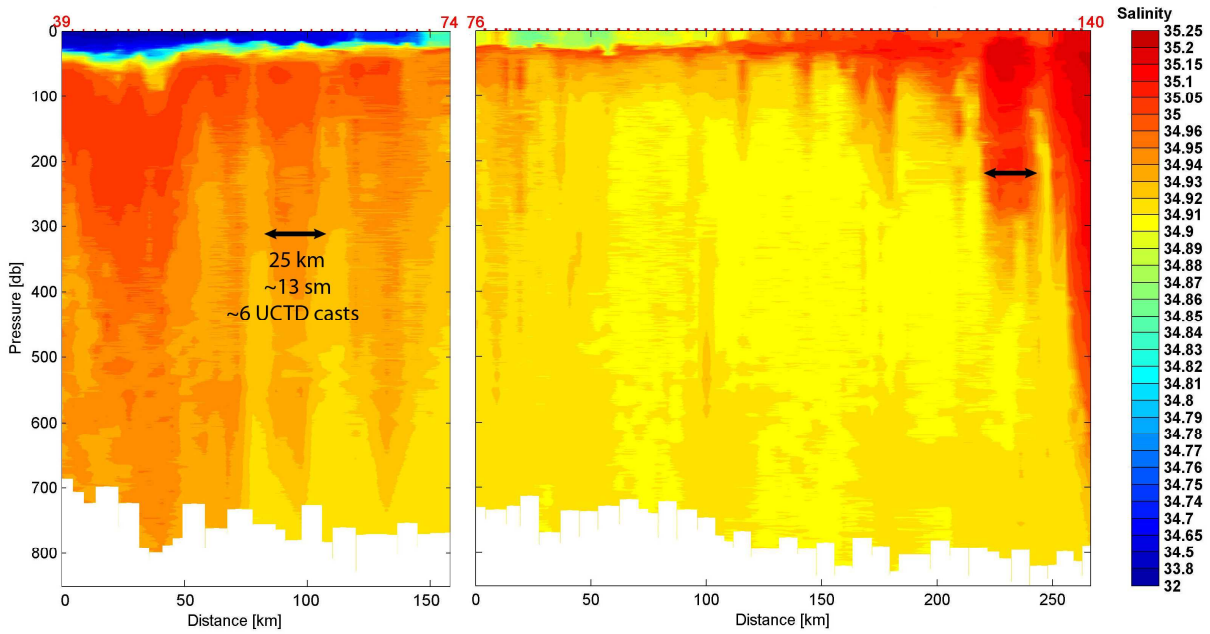

Figure 4:
Salinity section (combination of section B and C from figure 1) from the Greenland Sea Basin from UCTD measurements. The colour scale is nonlinear.

Saline (and warm) Atlantic Water masses dominate in the upper layer on the eastern part of the section, whereas these waters are overlaid by fresh (and cold) Polar surface waters in the western part of the section (figure 4). The intrusion of fresh waters near the surface into the centre of the Greenland Sea Basin is visible in the middle. Below the surface the relatively fresh waters in the basin are flanked at both sides by saline Atlantic water. The intersection between interior and surrounding shows eddy-like structures. These have diameters of ~ 25 km and reach depths of 700 m at the western side, whereas similar structures at the eastern side are smaller and reach at maximum 300 m. These structures are well resolved by the UCTD measurements with horizontal distances of ~ 2 nm.

Convection in the Greenland Sea Basin winter 2010/11

In the Greenland Sea Basin, the density of the water in the near-surface layer increases forced by heat loss to the atmosphere during winter. When it exceeds the density of the waters below, vertical mixing begins. With ingoing cooling this process will stepwise reach deeper layers. At the end of the winter a homogeneous layer down to the maximum convection depth is visible. Additionally, the oxygen concentration in this layer should be higher than below because the waters have been in contact with the atmosphere recently.

To get an idea how deep convection reached in the Greenland Sea Basin during the previous winter, the temperature, salinity and oxygen profiles from a CTD cast at 74° 41'N, 4° 22'W down to the bottom are shown in figur e 5. The distinct oxygen decrease at 1800 m suggests that convection reached this depth the previous winter. The homogeneous layer generated by convection is still present in the temperature and salinity profile at 800 to 1800 m depth but is destroyed in the upper layers due to lateral input of waters with Atlantic characteristics and summer warming from the atmosphere.

Of course, convection depth may vary in the Greenland Sea Basin and this station is only a snapshot from the whole. But this implies that at least intermediate waters have been reached by convection in winter 2010/11.

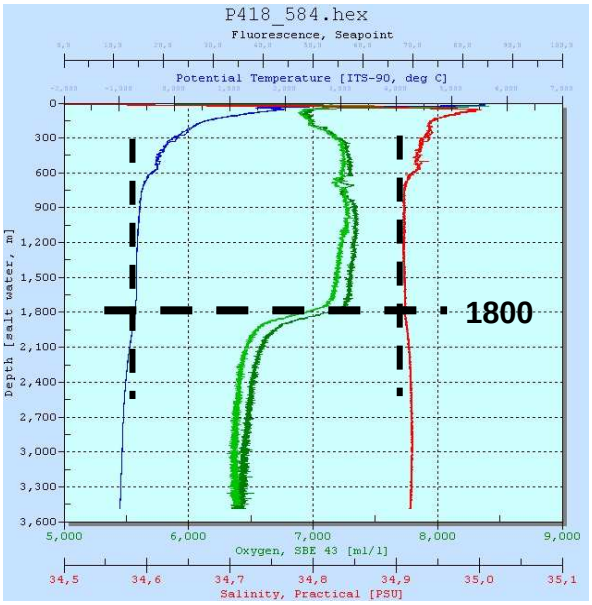

Figure 5:
Temperature (blue), salinity (red) and Oxygen (green) profile from CTD station 584 at 75°41'N, 4°22'W in the Greenland Sea Basin.

Acknowledgements

We would like to thank Captain Matthias Günther, his officers and the crew of RV POSEIDON for the support of our scientific programme, for their unending competent and friendly help. We like to express our special thanks to the chief engineer Hans Otto Stanger, 2nd engineer Günther Hagedorn and electrician Hermann Pregler for their dedicated and professional repairs of our UCTD-winch. Without their unending help the measurements with this instrument would have been stopped a few days after the cruise had started.
I personally would like to express my special thanks to Captain Matthias Günther and his officers Theo Griese and Diana Zach, how guided me very friendly and helpfully through all the new duties and responsibilities during my first cruise as chief scientist.

The ship time of RV POSEIDON and the financial support for the journey of scientists and transport of equipment was provided by the University of Hamburg and by the Nordatlantik-Projekt (DFG, 03F0605A). We gratefully acknowledge this support.

Station List

BE Begin of station
BO Near bottom reached on station
EN End of station

Stationlist - P418-2

EXPO-CODE	Stat. No.	UCTD Cast	CTD Cast	Type	Date	Time UTC	Code	POSITION Latitude		POSITION Longitude		Bottom depth	Max. press.	Bottom	Comments
07/POS418-2	556	1-		UCTD-Profile	24.07.11	8:08	BE	65°08.996	N	05°37.692	W				UCTD casts with
07/POS418-2	556	8		UCTD-Profile	24.07.11	10:34	EN	65°28.533	N	05°30.565	W				Ship speed betw. ? And ?
07/POS418-2	557		1	CTDO2/ROS/LADCP	24.07.11	11:16	BE	65°29.930	N	05°29.780	W	2896			
07/POS418-2	557		1	CTDO2/ROS/LADCP	24.07.11	11:29	BO	65°29.880	N	05°29.600	W	2896	500		Test CTD
07/POS418-2	557		1	CTDO2/ROS/LADCP	24.07.11	11:39	EN	65°29.839	N	05°29.520	W	2880			
07/POS418-2	558	9-		UCTD-Profile	24.07.11	12:02	BE	65°31.819	N	05°29.745	W				
07/POS418-2	558	24		UCTD-Profile	24.07.11	16:19	EN	66°24.831	N	05°22.466	W				
07/POS418-2	559		2	CTDO2/ROS/LADCP	25.07.11	16:19	BE	69°00.050	N	05°00.060	W	3421			
07/POS418-2	559		2	CTDO2/ROS/LADCP	25.07.11	17:18	BO	69°00.156	N	05°00.243	W	3421	3413	15.5	
07/POS418-2	559		2	CTDO2/ROS/LADCP	25.07.11	18:22	EN	69°00.023	N	04°59.945	W	3424			
07/POS418-2	559-2			Float deployment	25.07.11	18:30		69°00.02	N	04°59.94	W				Nemo float WMO NO 6901058
07/POS418-2	560		3	CTDO2/ROS/LADCP	25.07.11	19:50	BE	69°00.010	N	05°26.970	W	3306			
07/POS418-2	560		3	CTDO2/ROS/LADCP	25.07.11	20:43	BO	68°59.910	N	05°27.031	W	3307.1	3297	18.2	
07/POS418-2	560		3	CTDO2/ROS/LADCP	25.07.11	21:37	EN	68°59.892	N	05°27.207	W	3305.9			
07/POS418-2	560-2			Float deployment	25.07.11	21:43		68°59.91	N	05°27.31	W				nemo float, WMO No 6901059
07/POS418-2	561		4	CTDO2/ROS/LADCP	25.07.11	23:01	BE	69°00.044	N	05°54.916	W	3124.7			
07/POS418-2	561		4	CTDO2/ROS/LADCP	25.07.11	23:54	BO	69°00.414	N	05°54.310	W	3127.2	3113.7	13.8	
07/POS418-2	561		4	CTDO2/ROS/LADCP	26.07.11	0:47	EN	69°00.616	N	05°54.090	W	3128.9			
07/POS418-2	562		5	CTDO2/ROS/LADCP	26.07.11	2:21	BE	69°00.082	N	06°22.097	W	2929.8			
07/POS418-2	562		5	CTDO2/ROS/LADCP	26.07.11	3:11	BO	69°00.146	N	06°21.692	W	2927.3	2901.5	19.6	
07/POS418-2	562		5	CTDO2/ROS/LADCP	26.07.11	4:03	EN	69°00.307	N	06°21.454	W	2926.3			
07/POS418-2	563		6	CTDO2/ROS/LADCP	26.07.11	5:37	BE	69°00.089	N	06°60.028	W	2593.4			
07/POS418-2	563		6	CTDO2/ROS/LADCP	26.07.11	6:23	BO	69°00.335	N	06°50.116	W	2595.4	1568.1	18.9	
07/POS418-2	563		6	CTDO2/ROS/LADCP	26.07.11	7:08	EN	69°00.573	N	06°50.089	W	2597.1			
07/POS418-2	564		7	CTDO2/ROS/LADCP	26.07.11	8:28	BE	69°00.020	N	07°17.061	W	2316.9			
07/POS418-2	564		7	CTDO2/ROS/LADCP	26.07.11	9:08	BO	69°00.150	N	07°17.337	W	2316	2291.6	15.1	
07/POS418-2	564		7	CTDO2/ROS/LADCP	26.07.11	9:47	EN	69°00.270	N	07°17.600	W	2314.8			
07/POS418-2	565		8	CTDO2/ROS/LADCP	26.07.11	11:08	BE	69°00.005	N	07°45.030	W	1704.1			
07/POS418-2	565		8	CTDO2/ROS/LADCP	26.07.11	11:38	BO	69°00.085	N	07°45.334	W	1705.7	1672.6	15.8	
07/POS418-2	565		8	CTDO2/ROS/LADCP	26.07.11	12:09	EN	69°00.119	N	07°45.586	W	1702.6			
07/POS418-2	566		9	CTDO2/ROS/LADCP	26.07.11	13:30	BE	69°00.001	N	08°12.020	W	877.3			Kalibrierung UCTD
07/POS418-2	566		9	CTDO2/ROS/LADCP	26.07.11	13:48	BO	69°00.038	N	08°12.125	W	845.5	856.5	14.9	
07/POS418-2	566		9	CTDO2/ROS/LADCP	26.07.11	14:41	EN	69°00.148	N	08°12.541	W	857.8			
07/POS418-2	567		10	CTDO2/ROS/LADCP	26.07.11	16:09	BE	69°00.022	N	08°40.024	W	1074.5			
07/POS418-2	567		10	CTDO2/ROS/LADCP	26.07.11	16:31	BO	69°00.116	N	08°40.265	W	1104.1	1063.8	21.46	
07/POS418-2	567		10	CTDO2/ROS/LADCP	26.07.11	16:53	EN	69°00.223	N	08°40.481	W	1123			
07/POS418-2	568		11	CTDO2/ROS/LADCP	26.07.11	18:20	BE	69°00.005	N	09°07.091	W	1063			
07/POS418-2	568		11	CTDO2/ROS/LADCP	26.07.11	18:41	BO	69°00.065	N	09°07.313	W	1050.5	1034.7	19.2	
07/POS418-2	568		11	CTDO2/ROS/LADCP	26.07.11	19:02	EN	69°00.136	N	09°07.417	W	1052.7			

07/POS418-2	569		12	CTDO2/ROS/LADCP	26.07.11	20:23	BE	68°59.990	N	09°35.030	W	2064.8			
07/POS418-2	569		12	CTDO2/ROS/LADCP	26.07.11	20:59	BO	69°00.032	N	09°35.251	W	2064	2035	14.1	
07/POS418-2	569		12	CTDO2/ROS/LADCP	26.07.11	21:37	EN	69°00.068	N	09°35.636	W	2065.2			
07/POS418-2	569-2			Float deployment	26.07.11	21:43		69°00.08	N	09°35.70	W				APEX float, WMO No 6901070
07/POS418-2	570		13	CTDO2/ROS/LADCP	26.07.11	22:57	BE	69°00.014	N	10°02.027	W	2227.2			
07/POS418-2	570		13	CTDO2/ROS/LADCP	26.07.11	23:34	BO	69°00.036	N	10°02.216	W	2225.5	2195.9	15.4	
07/POS418-2	570		13	CTDO2/ROS/LADCP	27.07.11	0:14	EN	69°00.022	N	10°02.575	W	2225.7			
07/POS418-2	570-2			Float deployment	27.07.11	0:17		69°00.02	N	10°02.58	W				APEX float, WMO No 6901069, destroyed during deployment
07/POS418-2	571	25-		UCTD-Profile	27.07.11	8:39	BE	70°10.56	N	10°23.85	W				
07/POS418-2	571	29		UCTD-Profile	27.07.11	11:50	EN	70°38.67	N	10°32.90	W				
07/POS418-2	572	30-		UCTD-Profile	27.07.11	16:32	BE	71°23.62	N	10° 47.84	W				
07/POS418-2	572	38		UCTD-Profile	27.07.11	21:21	EN	72°09.62	N	11°03.71	W				
07/POS418-2	573		14	CTDO2/ROS/LADCP	29.07.11	5:08	BE	73°59.947	N	11°29.856	W	3018.5			
07/POS418-2	573		14	CTDO2/ROS/LADCP	29.07.11	6:01	BO	73°59.873	N	11° 30.530	W	3007.6	2989.0	18.1	
07/POS418-2	573		14	CTDO2/ROS/LADCP	29.07.11	6:56	EN	73°59.853	N	11°31.149	W	2997.8			
07/POS418-2	574		15	CTDO2/ROS/LADCP	29.07.11	8:20	BE	73°59.995	N	11°00.088	W	3074.5			
07/POS418-2	574		15	CTDO2/ROS/LADCP	29.07.11	9:03	BO	74°00.060	N	11°00.574	W	3076.2	3057.9	17.1	
07/POS418-2	574		15	CTDO2/ROS/LADCP	29.07.11	9:48	EN	74°00.134	N	11°01.077	W	3080.2			
07/POS418-2	575		16	CTDO2/ROS/LADCP	29.07.11	11:01	BE	73°59.986	N	10°30.61	W	3126.9			
07/POS418-2	575		16	CTDO2/ROS/LADCP	29.07.11	11:53	BO	73°59.994	N	10°30.542	W	3126.2	3112.9	15.2	
07/POS418-2	575		16	CTDO2/ROS/LADCP	29.07.11	12:46	EN	74° 00.004	N	10°31.218	W	3126.8			
07/POS418-2	576		17	CTDO2/ROS/LADCP	29.07.11	13:59	BE	74°00.047	N	09°59.905	W	3128.7			
07/POS418-2	576		17	CTDO2/ROS/LADCP	29.07.11	14:49	BO	74°00.133	N	09°59.770	W	3131.3	3119.6	14.1	
07/POS418-2	576		17	CTDO2/ROS/LADCP	29.07.11	15:46	EN	74°00.147	N	09°59.468	W	3135.9			
07/POS418-2	577		18	CTDO2/ROS/LADCP	29.07.11	17:05	BE	74°00.000	N	09°30.200	W	3175			
07/POS418-2	577		18	CTDO2/ROS/LADCP	29.07.11	18:00	BO	73°59.991	N	09°30.741	W	3172	3157.8	17.2	
07/POS418-2	577		18	CTDO2/ROS/LADCP	29.07.11	18:56	EN	73°59.917	N	09°31.114	W	3171.9			
07/POS418-2	578		19	CTDO2/ROS/LADCP	29.07.11	20:11	BE	73°59.997	N	09°00.005	W	3216.1			
07/POS418-2	578		19	CTDO2/ROS/LADCP	29.07.11	9:03	BO	74°00.067	N	09° 00.799	W	3215.0	3201.0	16.2	
07/POS418-2	578		19	CTDO2/ROS/LADCP	29.07.11	9:48	EN	74°00.173	N	09° 01.574	W	3210.3			
07/POS418-2	579		20	CTDO2/ROS/LADCP	29.07.11	23:10	BE	73°59.996	N	08°30.031	W	3244.8			
07/POS418-2	579		20	CTDO2/ROS/LADCP	30.07.11	0:04	BO	74°00.279	N	08°30.798	W	3247.2	3232.6	15.4	
07/POS418-2	579		20	CTDO2/ROS/LADCP	30.07.11	1:00	EN	74°00.385	N	08°31.517	W	3241.8			
07/POS418-2	580		21	CTDO2/ROS/LADCP	30.07.11	2:23	BE	74°00.010	N	07°59.965	W	3296.2			
07/POS418-2	580		21	CTDO2/ROS/LADCP	30.07.11	3:17	BO	74°00.491	N	07°59.854	W	3296	3279.3	19.2	
07/POS418-2	580		21	CTDO2/ROS/LADCP	30.07.11	4:10	EN	74°00.597	N	07°59.637	W	3295			
07/POS418-2	581		22	CTDO2/ROS/LADCP	30.07.11	5:25	BE	73°59.990	N	07°29.995	W	3333.9			
07/POS418-2	581		22	CTDO2/ROS/LADCP	30.07.11	6:22	BO	73°59.956	N	07°29.962	W	3335.4	3320.1	18.4	
07/POS418-2	581		22	CTDO2/ROS/LADCP	30.07.11	7:18	EN	74°00.015	N	07°30.101	W	3332.8			

07/POS418-2	582		23	CTDO2/ROS/LADCP	30.07.11	22:20	BE	76°14.560	N	07°09.620	W	1314.4			Kalibrierung UCTD
07/POS418-2	582		23	CTDO2/ROS/LADCP	30.07.11	22:42	BO	76°14.699	N	07°09.674	W	1311.3	1283	17.5	
07/POS418-2	582		23	CTDO2/ROS/LADCP	31.07.11	0:01	EN	76°15.031	N	07°09.413	W	1305.8			
07/POS418-2	583	39-		UCTD-Profile	31.07.11	0:32	BE	76°13.84	N	07°05.55	W				
07/POS418-2	583	59		UCTD-Profile	31.07.11	12:50	EN	75°42.81	N	04°28.32	W				
07/POS418-2	584		24	CTDO2/ROS/LADCP	31.07.11	13:34	BE	75°41.392	N	04°21.619	W	3553.8			
07/POS418-2	584		24	CTDO2/ROS/LADCP	31.07.11	14:30	BO	75°41.519	N	04°22.404	W	3554.6	3550.0	15.0	
07/POS418-2	584		24	CTDO2/ROS/LADCP	31.07.11	15:35	EN	75°41.578	N	04°23.378	W	3546.7			
07/POS418-2	585	60-		UCTD-Profile	31.07.11	16:11	BE	75°40.59	N	04°17.19	W				
07/POS418-2	585	75		UCTD-Profile	01.08.11	0:43	EN	75°18.50	N	02°28.79	W				
07/POS418-2	586		25	CTDO2/ROS/LADCP	01.08.11	5:05	BE	74°59.996	N	01°00.088	W	3547.1			
07/POS418-2	586		25	CTDO2/ROS/LADCP	01.08.11	6:06	BO	75°00.017	N	01°00.046	W	3566.0	3463	29.9	
07/POS418-2	586		25	CTDO2/ROS/LADCP	01.08.11	7:04	EN	74°59.997	N	01°00.004	W	3559.2			
07/POS418-2	586-2			Float deployment	01.08.11	7:15		74°59.99	N	01°00.10	W				APEX float, Finnland, WMO No 6901087
07/POS418-2	587		26	CTDO2/ROS/LADCP	01.08.11	8:20	BE	74°59.991	N	00°30.064	W	3751.4			
07/POS418-2	587		26	CTDO2/ROS/LADCP	01.08.11	8:39	BO	74°59.964	N	00°30.021	W	3751.9	1003.7		Kalibrierung UCTD
07/POS418-2	587		26	CTDO2/ROS/LADCP	01.08.11	9:49	EN	74°59.923	N	00°29.678	W	3752.0			
07/POS418-2	587-2			Float deployment	01.08.11	9:55		74°59.87	N	00°29.89	W				APEX float, Finnland, WMO No 6901086
07/POS418-2	588	76-		UCTD-Profile	01.08.11	10:18	BE	75°00.00	N	00°30.56	W				
07/POS418-3	588	106		UCTD-Profile	02.08.11	3:25	EN	75°00.00	N	03° 54.01	E				
07/POS418-2	589		27	CTDO2/ROS/LADCP	02.08.11	4:04	BE	74°59.80	N	04°01.78	E				
07/POS418-2	589		27	CTDO2/ROS/LADCP	02.08.11	4:54	BO	74°59.99	N	04°01.53	E	3051.1	3039.7	19.2	
07/POS418-2	589		27	CTDO2/ROS/LADCP	02.08.11	5:47	EN	75°00.09	N	04°01.60	E				
07/POS418-2	590	107-		UCTD-Profile	02.08.11	6:26	BE	75°00.03	N	04°08.34	E				
07/POS418-3	590	140		UCTD-Profile	03.08.11	0:41	EN	74°59.97	N	08°50.22	E				
07/POS418-2	591		28	CTDO2/ROS/LADCP	03.08.11	1:46	BE	75°00.04	N	09°00.18	E				
07/POS418-2	591		28	CTDO2/ROS/LADCP	03.08.11	2:05	BO	75°00.08	N	09°00.09	E	2680.4	1004.7		Kalibrierung UCTD
07/POS418-2	591		28	CTDO2/ROS/LADCP	03.08.11	3:05	EN	75°00.12	N	09°00.84	E				
07/POS418-2	592	141-		UCTD-Profile	04.08.11	2:47	BE	71°29.87	N	07°59.64	E				
07/POS418-3	592	195		UCTD-Profile	05.08.11	7:32	EN	70°01.95	N	04°05.01	E				
07/POS418-2	593		29	CTDO2/ROS/LADCP	05.08.11	8:16	BE	69°59.97	N	04°00.09	E				
07/POS418-2	593		29	CTDO2/ROS/LADCP	05.08.11	9:13	BO	69°59.70	N	04°01.91	E	3262.2	3261.6	18.7	
07/POS418-2	593		29	CTDO2/ROS/LADCP	05.08.11	10:10	EN	69°59.47	N	04°03.70	E				
07/POS418-2	593-2			Float deployment	05.08.11	11:18		69°59.41	N	4°04.12	E				APEX float WMO No 6901067
07/POS418-2	594		30	CTDO2/ROS/LADCP	05.08.11	11:27	BE	69°59.96	N	04°30.12	E				
07/POS418-2	594		30	CTDO2/ROS/LADCP	05.08.11	11:59	BO	69°59.60	N	04°31.58	E	3265.9	1958.2		Kalibrierung UCTD
07/POS418-2	594		30	CTDO2/ROS/LADCP	05.08.11	13:18	EN	69°58.79	N	04°35.48	E				
07/POS418-2	594-2			Float deployment	05.08.11	13:52		69°58.77	N	4°35.98	E				APEX float WMO No 6901068

Underway CTD - Stationlist

Sonde	Cast	Date	Time (from - to)	Time down cast [s]	Recording time [s]	max depth [m]	Latitude			Longitude			comments
2	1	24.7.2011	08:08 - 08:22	207	300	230	65	08.99	N	05	37.69	W	
2	2	24.7.2011	08:27 - 08:41	212	300	233	65	11.51	N	05	36.76	W	
2	3	24.7.2011	08:45 - 08:59	205	300	240	65	13.85	N	05	35.91	W	
2	4	24.7.2011	09:04 - 09:18	203	300	241	65	16.34	N	05	35.01	W	
2	5	24.7.2011	09:21 - 09:35	224	300	235	65	18.61	N	05	34.18	W	
2	6	24.7.2011	09:38 - 09:53	256	300	243	65	20.90	N	05	33.34	W	
2	7	24.7.2011	09:57 - 10:14	231	300	243	65	23.45	N	05	32.41	W	
2	8	24.7.2011	10:17 - 10:33	233	300	216	65	26.15	N	05	31.43	W	
1	9	24.7.2011	12:02 - 12:22	330	400	389	65	31.81	N	05	29.74	W	
1	10	24.7.2011	12:26 - 12:46	330	400	388	65	34.26	N	05	29.38	W	
1	11	24.7.2011	12:51 - 13:11	330	400	389	65	36.88	N	05	28.99	W	
1	12	24.7.2011	13:16 - 13:37	400	400	458	65	39.44	N	05	28.63	W	
1	13	24.7.2011	13:41 - 14:02	414	400	456	65	41.46	N	05	28.32	W	
1	14	24.7.2011	14:07 - 14:28	417	400	451	65	43.51	N	05	28.06	W	
1	15	24.7.2011	14:33 - 14:54	443	400	480	65	45.44	N	05	27.79	W	
1	16	24.7.2011	15:12 - 15:33	420	400	508	65	48.06	N	05	27.44	W	
1	17	24.7.2011	15:37 - 15:58	420	400	484	65	49.84	N	05	27.21	W	
2	18	24.7.2011	16:15 - 16:28	325	300	428	65	52.51	N	05	26.85	W	
1	19	24.7.2011	17:09 - 17:35	552	600	590	65	57.60	N	05	26.19	W	
1	20	24.7.2011	18:05 - 18:32	600	600	599	66	02.44	N	05	25.53	W	
1	21	24.7.2011	19:03 - 19:29	580	600	576	66	06.64	N	05	24.95	W	
1	22	24.7.2011	19:59 - 20:27	635	600	577	66	11.94	N	05	24.26	W	
1	23	24.7.2011	20:59 - 21:27	574	600	570	66	17.54	N	05	23.48	W	
1	24	24.7.2011	21:59 - 22:27	626	600	580	66	23.06	N	05	22.72	W	
1	25	27.7.2011	08:39 - 09:05	251	0	572	70	10.56	N	10	23.85	W	
1	26	27.7.2011	09:22 - 09:52	580	0	701,4	70	16.63	N	10	25.80	W	
2	27	27.7.2011	10:36 - 11:01	232	300	621	70	26.99	N	10	29.11	W	
2	28	27.7.2011	11:15 - 11:39	217	300	469	70	33.03	N	10	31.06	W	
2	29	27.7.2011	11:50 - 12:18	239	300	451	70	38.67	N	10	32.90	W	(1)
1	30	27.7.2011	16:32 - 16:57	261	400	607	71	23.62	N	10	47.84	W	

1	31	27.7.2011	17:20 - 17:46	262	400	627	71	31.31	N	10	50.44	W	
1	32	27.7.2011	17:53 - 18:17	266	400	566	71	36.61	N	10	52.24	W	
1	33	27.7.2011	18:27 - 18:52	250	400	596	71	42.14	N	10	54.14	W	
2	34	27.7.2011	19:12 - 19:38	240	400	563	71	49.30	N	10	56.61	W	
2	35	27.7.2011	19:45 - 20:11	234	400	604	71	54.63	N	10	58.47	W	
2	36	27.7.2011	20:18 - 20:43	246	400	594	71	59.85	N	11	00.29	W	
2	37	27.7.2011	20:50 - 21:15	235	400	625	72	04.78	N	11	02.01	W	
2	38	27.7.2011	21:21 - 22:43	245	400	587	72	09.62	N	11	03.71	W	(2)
2	39	31.7.2011	00:32 - 01:00	525	0	685	76	13.84	N	07	05.55	W	
1	40	31.7.2011	01:08 - 01:36	506	600	705	76	12.18	N	06	57.88	W	
1	41	31.7.2011	01:42 - 02:09	506	600	721	76	10.75	N	06	49.81	W	
2	42	31.7.2011	02:18 - 02:45	507	0	722	76	09.14	N	06	41.44	W	
2	43	31.7.2011	02:51 - 03:19	483	0	696	76	07.60	N	06	33.64	W	
2	44	31.7.2011	03:26 - 03:53	480	0	759	76	05.98	N	06	25.32	W	
2	45	31.7.2011	03:59 - 04:27	580	0	721	76	04.49	N	06	17.74	W	
2	46	31.7.2011	04:33 - 04:59	478	0	790	76	03.08	N	06	10.43	W	
2	47	31.7.2011	05:06 - 05:40	508	0	807	76	01.72	N	06	03.52	W	
1	48	31.7.2011	06:01 - 06:31	457	0	798	75	59.81	N	05	54.59	W	
1	49	31.7.2011	06:37 - 07:06	561	0	785	75	58.47	N	05	47.03	W	
1	50	31.7.2011	07:13 - 07:42	507	0	774	75	57.11	N	05	40.15	W	
1	51	31.7.2011	07:52 - 08:20	505	0	723	75	55.48	N	05	31.83	W	
1	52	31.7.2011	08:27 - 08:55	504	0	792	75	53.95	N	05	24.10	W	
2	53	31.7.2011	09:05 - 09:34	527	0	760	75	52.36	N	05	16.13	W	
2	54	31.7.2011	09:39 - 10:08	504	0	768	75	50.91	N	05	08.82	W	
2	55	31.7.2011	10:13 - 10:42	506	0	730	75	49.41	N	05	01.30	W	
1	56	31.7.2011	11:01 - 11:30	579	0	756	75	47.35	N	04	50.97	W	
1	57	31.7.2011	11:43 - 12:11	518	0	754	75	45.57	N	04	42.06	W	
1	58	31.7.2011	12:17 - 12:45	523	0	761	75	44.16	N	04	35.01	W	
1	59	31.7.2011	12:50 - 13:18	529	0	779	75	42.81	N	04	28.32	W	
1	60	31.7.2011	16:11 - 16:39	515	0	778	75	40.59	N	04	17.19	W	
1	61	31.7.2011	16:45 - 17:12	485	0	724	75	39.14	N	04	10.01	W	
1	62	31.7.2011	17:18 - 17:46	517	0	781	75	37.73	N	04	03.04	W	
1	63	31.7.2011	17:52 - 18:19	480	0	808	75	36.28	N	03	55.87	W	
1	64	31.7.2011	18:25 - 18:53	540	0	759	75	34.87	N	03	48.85	W	
2	65	31.7.2011	19:07 - 19:35	487	0	826	75	33.04	N	03	39.84	W	
2	66	31.7.2011	19:40 - 20:07	492	0	769	75	31.63	N	03	32.89	W	

2	67	31.7.2011	20:13 - 20:41	470	0	-							
2	68	31.7.2011	20:46 - 21:14	468	0	769	75	28.78	N	03	18.92	W	
2	69	31.7.2011	21:20 - 21:47	469	0	802	75	27.31	N	03	11.72	W	
2	70	31.7.2011	21:52 - 22:20	480	0	751	75	25.97	N	03	05.11	W	
2	71	31.7.2011	22:25 - 22:52	440	0	788	75	24.50	N	02	57.93	W	
1	72	31.7.2011	23:04-23:32	510	0	769	75	22.78	N	02	49.56	W	
1	73	31.7.2011	23:38-00:05	473	0	-							
1	74	01.8.2011	00:10-00:38	481	0	766	75	19.95	N	02	35.85	W	
1	75	01.8.2011	00:43-01:41	465	0	789	75	18.50	N	02	28.79	W	(3)
1	76	01.8.2011	10:18-10:46	511	0	729	75	00.00	N	00	30.56	W	
1	77	01.8.2011	10:52-11:20	524	0	748	75	00.00	N	00	21.53	W	
2	78	01.8.2011	11:31-11:59	517	0	733	74	59.99	N	00	11.19	W	
2	79	01.8.2011	12:04-12:32	515	0	756	75	00.05	N	00	02.48	W	
2	80	01.8.2011	12:37-13:05	527	0	726	75	00.14	N	00	06.14	E	
2	81	01.8.2011	13:10-13:38	509	0	758	75	00.25	N	00	14.71	E	
2	82	01.8.2011	13:44-14:11	517	0	711	75	00.42	N	00	23.54	E	
2	83	01.8.2011	14:16-14:44	506	0	787	75	00.58	N	00	31.70	E	
2	84	01.8.2011	14:49-15:16	560	0	767	75	00.73	N	00	40.03	E	
1	85	01.8.2011	15:32-15:59	533	0	785	75	00.81	N	00	51.09	E	
1	86	01.8.2011	16:04-16:31	510	0	733	75	00.60	N	00	59.28	E	
1	87	01.8.2011	16:37-17:04	493	0	774	75	00.40	N	01	07.90	E	
1	88	01.8.2011	17:09-17:36	495	0	734	75	00.20	N	01	16.08	E	
1	89	01.8.2011	17:42-18:09	470	0	764	75	00.05	N	01	24.73	E	
1	90	01.8.2011	18:15-18:42	540	0	726	74	59.99	N	01	33.41	E	
2	91	01.8.2011	18:58-19:25	488	0	755	75	00.00	N	01	44.43	E	
2	92	01.8.2011	19:30-19:57	508	0	716	74	59.95	N	01	52.81	E	
2	93	01.8.2011	20:03-20:30	499	0	731	74	59.97	N	02	01.63	E	
2	94	01.8.2011	20:35-21:02	503	0	738	75	00.01	N	02	10.46	E	
2	95	01.8.2011	21:07-21:34	509	0	775	75	00.04	N	02	19.21	E	
2	96	01.8.2011	21:39-22:07	536	0	720	75	00.01	N	02	27.61	E	
2	97	01.8.2011	22:12-22:39	499	0	779	75	00.00	N	02	36.13	E	
1	98	01.8.2011	22:50-23:17	513	0	733	74	59.97	N	02	46.13	E	
1	99	01.8.2011	23:23-23:51	500	0	763	75	00.04	N	02	54.58	E	
1	100	01.8.2011	23:56-00:24	537	0	744	75	00.01	N	03	02.97	E	
1	101	02.8.2011	00:29-00:57	537	0	771	74	59.99	N	03	11.09	E	
1	102	02.8.2011	01:02-01:30	523	0	780	74	59.99	N	03	19.15	E	

1	103	02.8.2011	01:35-02:03	527	0	791	75	00.00	N	03	27.23	E	
1	104	02.8.2011	02:09-02:36	538	0	765	75	00.03	N	03	35.39	E	
1	105	02.8.2011	02:41-03:08	513	0	805	75	00.00	N	03	43.12	E	
2	106	02.8.2011	03:25-03:52	500	0	791	75	00.00	N	03	54.01	E	
2	107	02.8.2011	06:26-06:54	478	0	793	75	00.03	N	04	08.34	E	
2	108	02.8.2011	06:59-07:26	486	0	774	75	00.00	N	04	17.03	E	
2	109	02.8.2011	07:31-07:58	479	0	802	74	59.99	N	04	25.46	E	
2	110	02.8.2011	08:03-08:31	504	0	793	74	59.96	N	04	33.81	E	
2	111	02.8.2011	08:36-09:03	482	0	833	74	59.95	N	04	42.20	E	
2	112	02.8.2011	09:09-09:36	503	0	782	74	59.97	N	04	50.64	E	
2	113	02.8.2011	09:40-10:07	469	0	833	75	00.03	N	04	58.63	E	
2	114	02.8.2011	10:12-10:39	485	0	819	75	00.01	N	05	06.80	E	
2	115	02.8.2011	10:43-11:10	?	0	822	74	59.99	N	05	14.70	E	
1	116	02.8.2011	11:20-	?	0	775	75	00.00	N	05	24.27	E	
1	117	02.8.2011	11:53-	?	0	803	74	59.99	N	05	32.70	E	
1	118	02.8.2011	12:24-	?	0	788	75	00.00	N	05	40.54	E	
1	119	02.8.2011	12:56-	?	0	833	74	59.98	N	05	48.70	E	
1	120	02.8.2011	13:27-	?	0	826	74	59.99	N	05	56.53	E	
1	121	02.8.2011	13:59-	?	0	801	75	00.00	N	06	04.68	E	
	122	02.8.2011	14:32-	?	0	822							
2	123	02.8.2011	15:18-	?	0	823	75	00.03	N	06	25.50	E	
2	124	02.8.2011	15:50-	?	0	779	74	59.96	N	06	34.27	E	
2	125	02.8.2011	16:21-	?	0	805	74	59.90	N	06	42.84	E	
2	126	02.8.2011	16:53-	?	0	790	75	00.00	N	06	51.31	E	
2	127	02.8.2011	17:26-	?	0	835	75	00.04	N	06	59.87	E	
2	128	02.8.2011	17:58-	?	0	790	75	00.02	N	07	08.30	E	
2	129	02.8.2011	18:31-	?	0	797	74	59.99	N	07	17.24	E	
1	130	02.8.2011	19:10-19:42	525	0	807	74	59.99	N	07	27.67	E	
2	131	02.8.2011	19:51-20:18	519	0	844	74	59.96	N	07	38.48	E	
2	132	02.8.2011	20:23-20:51	561	0	795	74	59.94	N	07	46.81	E	
2	133	02.8.2011	20:56-21:24	558	0	860	74	59.98	N	07	55.08	E	
1	134	02.8.2011	21:30-21:57	510	0	818	75	00.01	N	08	03.35	E	
1	135	02.8.2011	22:02-22:29	490	0	838	75	00.04	N	08	11.36	E	
1	136	02.8.2011	22:34-23:01	492	0	817	74	59.99	N	08	19.19	E	
1	137	02.8.2011	23:06-23:33	466	0	797	75	00.00	N	08	27.04	E	
1	138	02.8.2011	23:38-00:05	484	0	811	75	00.04	N	08	34.90	E	

1	139	03.8.201	00:10-00:37	451	0	835	75	00.03	N	08	42.56	E	
1	140	03.8.2011	00:41-01:08	476	0	787	74	59.97	N	08	50.22	E	
2	141	04.8.2011	02:47-03:14	474	0	831	71	29.87	N	07	59.64	E	
2	142	04.8.2011	03:19-03:45	413	0	835	71	28.22	N	07	55.08	E	
2	143	04.8.2011	03:51-04:17	450	0	806	71	26.47	N	07	50.24	E	
2	144	04.8.2011	04:22-04:48	440	0	859	71	24.88	N	07	45.88	E	
2	145	04.8.2011	04:53-05:19	460	0	815	71	23.26	N	07	41.39	E	
2	146	04.8.2011	05:24-05:50	479	0	870	71	21.58	N	07	36.79	E	
2	147	04.8.2011	05:55-06:22	469	0	877	71	19.97	N	07	32.36	E	
2	148	04.8.2011	06:27-06:53	475	0	857	71	18.31	N	07	27.81	E	
1	149	04.8.2011	07:04-07:31	475	0	861	71	16.42	N	07	22.61	E	
1	150	04.8.2011	07:36-08:03	474	0	834	71	14.83	N	07	18.29	E	
1	151	04.8.2011	08:09-08:35	459	0	868	71	13.22	N	07	13.87	E	
1	152	04.8.2011	08:40-09:06	479	0	831	71	11.71	N	07	09.76	E	
1	153	04.8.2011	09:10-09:37	437	0	831	71	10.21	N	07	05.66	E	
1	154	04.8.2011	09:42-10:08	459	0	801	71	08.51	N	07	01.06	E	
1	155	04.8.2011	10:12-10:38	453	0	838	71	06.96	N	06	56.84	E	
1	156	04.8.2011	10:43-11:09	454	0	818	71	05.40	N	06	52.59	E	
2	157	04.8.2011	11:20-11:46	436	0	844	71	03.47	N	06	47.37	E	
2	158	04.8.2011	11:50-12:16	461	0	806	71	01.92	N	06	43.18	E	
2	159	04.8.2011	12:21-12:47	438	0	846	71	00.32	N	06	38.87	E	
2	160	04.8.2011	12:52-13:18	452	0	818	70	58.76	N	06	34.64	E	
2	161	04.8.2011	13:23-13:48	430	0	847	70	57.19	N	06	30.40	E	
2	162	04.8.2011	13:53-14:19	445	0	831	70	55.64	N	06	26.24	E	
2	163	04.8.2011	14:24-14:50	441	0	818	70	54.06	N	06	21.99	E	
1	164	04.8.2011	15:04-15:30	447	0	789	70	52.10	N	06	16.73	E	
1	165	04.8.2011	15:35-16:00	420	0	825	70	50.62	N	06	12.76	E	
1	166	04.8.2011	16.05-16:31	443	0	803	70	49.20	N	06	08.97	E	
1	167	04.8.2011	16:36-17:02	430	0	806	70	47.64	N	06	04.80	E	
1	168	04.8.2011	17:07-17:33	441	0	818	70	46.03	N	06	00.49	E	
1	169	04.8.2011	17:38-18:03	437	0	834	70	44.41	N	05	56.21	E	
1	170	04.8.2011	18:08-18:37	481	0	826	70	42.86	N	05	52.06	E	
2	171	04.8.2011	18.52-19:17	435	0	860	70	40.62	N	05	46.11	E	
2	172	04.8.2011	19:22:19:48	453	0	822	70	39.11	N	05	42.11	E	
2	173	04.8.2011	19:53.20:19	441	0	843	70	37.51	N	05	37.85	E	
2	174	04.8.2011	20:24:20:50	455	0	817	70	35.90	N	05	33.61	E	

2	175	04.8.2011	20:55-21:21	442	0	861	70	34.33	N	05	29.45	E	
2	176	04.8.2011	21:25-21:51	445	0	809	70	32.80	N	05	25.41	E	
2	177	04.8.2011	21:56-22:21	419	0	824	70	31.20	N	05	21.21	E	
1	178	04.8.2011	22:31-22:58	450	0	810	70	29.37	N	05	16.38	E	
1	179	04.8.2011	23:03-23:29	435	0	813	70	27.67	N	05	11.91	E	
1	180	04.8.2011	23:34-00:00	447	0	792	70	26.02	N	05	07.57	E	
1	181	05.8.2011	00:36-00:30	427	0	840	70	24.36	N	05	03.23	E	
1	182	05.8.2011	00:36-01:02	458	0	802	70	22.72	N	04	58.93	E	
1	183	05.8.2011	01:07-01:33	445	0	801	70	21.09	N	04	54.66	E	
1	184	05.8.2011	01:38-02:05	453	0	797	70	19.47	N	04	50.42	E	
1	185	05.8.2011	02:11-02:37	441	0	830	70	17.75	N	04	45.94	E	
1	186	05.8.2011	02:42-03:08	445	0	773	70	16.15	N	04	41.78	E	
2	187	05.8.2011	03:24-03:50	420	0	828	70	13.96	N	04	36.07	E	
2	188	05.8.2011	03:55-04:21	451	0	802	70	12.37	N	04	31.94	E	
2	189	05.8.2011	04:26-04:52	437	0	823	70	11.11	N	04	28.69	E	
2	190	05.8.2011	04:57-05:23	440	0	782	70	09.28	N	04	23.94	E	
2	191	05.8.2011	05:28-05:54	435	0	814	70	07.75	N	04	20.00	E	
2	192	05.8.2011	05:59-06:25	454	0	801	70	06.29	N	04	16.23	E	
2	193	05.8.2011	06:30-06:56	435	0	846	70	04.88	N	04	12.56	E	
2	194	05.8.2011	07:01-07:27	420	0	774	70	03.50	N	04	09.02	E	
2	195	05.8.2011	07:32-07:57	391	0	764	70	01.95	N	04	05.01	E	

1 - Sonde 0067
2 - Sonde 0068

(1) During the lowering the line was not running freely out, but there seemed to be a resistance. Checking the line spool of the winch showed, that the spool was fixed under high pressure between two snap rings on the axis. The pressure decreased when we removed one 1mm washer in front of the spool. Afterwards the spool of the winch was again turning freely during the lowering of the probe.

(2) During the last reel-in the engine of the winch stopped working immediately and it smelled like am electrical failure. We brought the line and probe in with a drill on the bolt of the manual gear hub. After opening of the winch we saw that 2 of the plastic screws, holding the carbon brushes of the motor, were deformed and partly melted. After dismantling of the electrical motor it became visible that the coils have changed the colour from red to dark blue on the side of the collector. But the coils did not have short-circuited to each other and also not to the metal ground. All resistors have the same value, only one increased to 9 Ohm (normally 0.6 Ohm). After over twisting the collector and fixing the carbon brushes with plastic plugs in their holes we assembled the electric motor. We found out that the motor was working well and the torque was strong enough.

(3) On reel-in the level wind stopped working, we did the proper winding by hand for the rest of the cast. We opened the winch and found out, that the voltage regulator became wet, probably because of the air-cooling we installed. After drying and new sealing with DC4 compound of this part the level wind was working again. But we found a defective contact of the motor when we tried to start it again. After putting the power supply off-on we found out that it was working, when the digital readout inside of the winch did not show a “8.”. But we were not able to find out, what influences the digital readout, nor found something about this in the manuals.

during cast 26-195 maximum line was on the tail spool before deployment